this paragraph do not apply to a securement system in which the tiedown assembly consists of steel strapping or to a tiedown assembly which is not required by the rules in this section.

(49 U.S.C. 304, 1655; 49 CFR 1.48(b) and 301.60)

[38 FR 23522, Aug. 31, 1973, as amended at 47 FR 47837, Oct. 28, 1982; 59 FR 34718, July 6, 1994; 59 FR 43898, Aug. 25, 1994]

§ 393.104 Blocking and bracing.

(a) *Protection against longitudinal movement.* When a motor vehicle carries cargo that is not firmly braced against a front-end structure that conforms to the requirements of § 393.106, the cargo must be secured so that, when the vehicle decelerates at a rate of 20 feet per second per second, the cargo will remain on the vehicle and will not penetrate the vehicle's front-end structure.

(b) *Protection against lateral movement.* When a vehicle carries cargo that may shift sideways in transit, the cargo must either be securely blocked or braced against the sides, sideboards, or stakes of the vehicle or be secured by devices that conform to the requirements of paragraph (b)(2), (b)(3), or (b)(4) of § 393.100.

(c) *Effective date.* This section is effective on October 1, 1973.

[38 FR 23522, Aug. 31, 1973, as amended at 38 FR 25183, Sept. 12, 1973]

§ 393.106 Front-end structure.

(a) *General rule.* (1) Except as provided in paragraph (g) of this section, every cargo-carrying motor vehicle must be equipped with a headerboard or similar device of sufficient strength to prevent load shifting and penetration or crushing of the driver's compartment.

(2) On and after the effective dates specified in paragraph (h) of this section, every cargo-carrying motor vehicle must have a front-end structure that conforms to the rules in this section.

(b) *Location.* The front-end structure must be located between the vehicle's cargo and the vehicle's driver.

(c) *Height and width.* The front-end structure must extend either to a height of 4 feet above the floor of the vehicle or to a height at which it blocks forward movement of any item of cargo being carried on the vehicle, whichever is lower. The front-end structure must have a width which is at least equal to the width of the vehicle or which blocks forward movement of any item of cargo being transported on the vehicle, whichever is narrower.

(d) *Strength.* The front-end structure must be capable of withstanding the horizontal forward static load specified in either paragraph (d) (1) or (2) of this section.

(1) For a front-end structure less than 6 feet in height, a horizontal forward static load equal to one half (½) of the weight of the cargo being transported on the vehicle uniformly distributed over the entire portion of the front-end structure that is within 4 feet above the vehicle's floor or that is at or below a height above the vehicle's floor at which it blocks forward movement of any item of the vehicle's cargo, whichever is less.

(2) For a front-end structure 6 feet in height or higher, a horizontal forward static load equal to four-tenths (0.4) of the weight of the cargo being transported on the vehicle uniformly distributed over the entire front-end structure.

(e) *Penetration resistance.* The front-end structure must be designed, constructed and maintained so that it is capable of resisting penetration by any item of cargo that contacts it when the vehicle decelerates at a rate of 20 feet per second per second. The front-end structure must have no aperture large enough to permit any item of cargo in contact with the structure to pass through it.

(f) *Substitute devices.* The requirements of this section may be met by the use of devices performing the same functions as a front-end structure, if the devices are at least as strong as, and provide protection against shifting cargo at least equal to, a front-end structure which conforms to those requirements.

(g) *Exemptions.* The following motor vehicles are exempt from the rules in this section:

(1) A vehicle which is designed and used exclusively to transport other vehicles, if each vehicle it transports is securely tied down by devices that conform to the requirements of § 393.102.